Florida
Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

August 5, 1994
3F0894-06

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Subject: Revised Response to Generic Letter 89-13

Reference: FPC to NRC Letter, 3F0190-17, dated January 30, 1990

Dear Sir:

Florida Power Corporation (FPC) is submitting this letter to revise FPC's response to Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment. The generic letter requested each licensee to perform 5 actions. The letter attachment supersedes the action descriptions provided in the reference letter and we have indicated the changed portions with a vertical line in the right margin. FPC's response is numbered to agree with the generic letter.

Sincerely,

P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB/JWT/DC:ff

Attachment

xc: Regional Administrator, Region II
Senior Resident Inspector
NRR Project Manager

A065

STATE OF FLORIDA

COUNTY OF CITRUS

P. M. Beard, Jr. states that he is the Senior Vice President, Nuclear Operations for Florida Power Corporation; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission the information attached hereto; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information, and belief.

P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

Subscribed and sworn to before me, a Notary Public in and for the State and County above named, this 5th day of August, 1994.

JOAN E. MOUNTS

Notary Public (print)

Notary Public (signature)

Notary Public, State of Florida at Large,

My Commission Expires: Notary Public, State of Florida My Commission Expires Oct. 17, 1994 Bonded Thru Troy Fain - Insurance Inc.

ATTACHMENT

The generic letter classifies service water either as open-cycle or closed-cycle systems. Accordingly, the CR-3 Nuclear Service and Decay Heat Seawater System (RW) is an open-cycle system while the Nuclear Service Closed Cycle Cooling System (SW) and the Decay Heat Closed Cycle Cooling System (DC) are closed-cycle systems. The SW System and the DC System are physically separate and do not share components All three systems are classified as safety-related. The RW System supplies seawater to the operating heat exchanger(s) in the SW and DC systems for all plant operating modes. The SW System is in service at all times, but the system heat loads vary depending upon the equipment in operation. The DC System is used during normal reactor cooldown, for heat removal during plant shutdown, and would be required for emergency cooling during a Loss of Coolant Accident (LOCA). FSAR Figures 9-7, 9-8, and 9-10 show the flow diagrams for the RW System, SW System, and DC System, respectively.

GENERIC LETTER 89-13 ACTIONS

I. The Nuclear Service and Decay Heat Seawater (RW) System operates under a program of frequent regular maintenance which has reduced the incidence of flow blockage problems. RW pump discharge pressures are monitored using SP-300, Operating Daily Surveillance Log, to determine whether SW heat exchanger fouling has occurred.

One of the four Nuclear Service Closed Cycle Cooling (SW) System heat exchangers is removed from service each week, on a rotating basis, to be inspected and cleaned. Gross macrofouling is removed from all accessible tubes and tubesheets. Plant personnel inspect for leaking tubes and degraded flow baffles. FPC may revise the frequency of these heat exchanger inspections if trending indicates that the macrofouling rate is changing.

The two remaining heat exchangers served by the RW System are a part of the Decay Heat Closed Cycle Cooling (DC) System and require entry into a Technical Specification Action Statement or a plant outage to perform inspections and maintenance. During normal plant operations, both DC heat exchangers are in standby mode and, therefore, do not experience the influx of fouling or debris at the level experienced by the SW heat exchangers.

Enclosure 1 to the generic letter suggests that the service water system be continuously chlorinated whenever macroscopic biological fouling species exist. The State of Florida Administrative Code imposes a water quality limit of 0.01 ppm per day which is near the limit of detection for chlorine. In addition, the Environmental Protection Agency's (EPA) Steam/Electric Effluent Guidelines in 40 CFR 423.12 limit the amount of chlorine discharged to no greater than 0.2 ppm in a 2 hour period per 24 hours. CR-3 cannot operate with continuous chlorination of the RW System and meet the federal and state water quality restrictions.

The absence of an effective and legally approved biocide in Florida can result in macrofouling growth on RW intake structures, piping, and the RW pits. The macrofouling could possibly build up to a point where it may slough off and may become entrained in the cooling water flow stream that passes through the SW and DC heat exchangers. To preclude this macrofouling, FPC inspected both "A" and "B" RW trains from the bar racks to the RW pump pits during Refueling Outage 9 which ended in June 1994. Macrofouling found was removed.

During Refueling Outage 10, presently scheduled for Spring 1996, an underwater visual inspection is planned of both trains. Past history indicates that marine growth in the "B" train system piping can increase at a rate where the potential for loose debris exists after only two fuel cycles (4years). The "A" train system piping does not normally nave seawater flowing through it and does not experience the same rate of

marine growth. The results of the Outage 9 cleaning and the Outage 10 inspections will allow FPC to determine whether additional programs to control macrofouling growth removal are necessary. It is expected that an alternating program of cleaning one outage and inspections the next will be sufficient.

II. The generic letter requested that each licensee conduct a test program to verify the heat transfer capability of all safety-related heat exchangers cooled by service water. FPC has relied on frequent regular maintenance of heat exchangers in lieu of testing. However, some heat exchanger testing has already been performed at CR-3.

In 1987, an NRC Operational Safety Team Inspection (OSTI) identified a discrepancy with the design temperature for the ultimate heat sink (UHS). To confirm operability, the manufacturers of all safety-related components (i.e., motor coolers, heat exchangers, etc.) provided documentation and/or analysis to permit operation with cooling water at temperatures slightly above that specified during original procurement. FPC also performed a thermal hydraulic analysis on the RW, SW, and DC Systems to confirm that the appropriate UHS temperature would not cause other plant systems, components, and equipment to exceed established temperature limits. This evaluation has been previously submitted and accepted by the NRC. In addition to this analysis, FPC did actual performance testing of the SWHE's in June 1988. This testing confirmed that the actual heat transfer coefficient exceeded the heat transfer coefficient assumed in all analyses. The thermal hydraulic analysis performed on the SWHE's used the overall heat transfer coefficient associated with 20% fouling.

In the intervening years since the generic letter was issued, FPC has evaluated the system variables considered appropriate for testing heat transfer capability. Our conclusion is that it is not cost-beneficial to install additional test instrumentation which might achieve the accuracy considered necessary to give a high confidence to heat exchanger performance testing. In addition, it is not practical to test the heat exchangers at design conditions such as those imposed by a LOCA. Industry results have shown the difficulty in achieving an acceptable performance test. EPRI has developed a heat exchanger test device which FPC believes will provide a satisfactory means to determine heat exchanger performance. The EPRI "Heat Exchanger In-Situ Single Tube Test Device" (described in EPRI Report TR-103047) will be used on the SW and DC heat exchangers. Field testing of the device has been successful in several other nuclear plant applications. FPC has established the program to implement testing with this device.

The performance of the closed cycle systems at CR-3 do not indicate the need for testing. CR-3 continues to maintain a proactive chemical treatment of the closed cycle systems. This chemical treatment has taken place since initial plant startup. Visual examination, via video, has shown the SW System side of the Service Water Heat Exchangers (SWHE) to be free of corrosion and fouling. This condition has been substantiated by physical examination of pulled tubes.

FPC continues to monitor the performance of its RW, SW, and DC Systems. To add confidence that the preventative maintenance program is working, we will be doing onsite testing using the single tube tester discussed earlier. These testing and maintenance programs can provide valuable data for monitoring plant performance to assure continued functioning of the system. A summary of the program will be documented and all relevant documentation retained in plant records.

III. As FPC stated in Section I, CR-3 has an established preventative maintenance program for the RW heat exchangers. CR-3 also inspected the internal condition of large bore lined RW piping during Refuel 7 in Spring 1990. The results of this inspection is documented on video tape and maintained in plant records. Since 1990, periodic visual inspections of accessible RW piping have identified areas where the protective urethane coating has degraded. This piping has either been repaired or is being monitored for pipe wall loss. If necessary, piping in the latter category will be replaced during a scheduled outage.

IV. As FPC stated in Section II, a confirmation of the RW, SW, and DC Systems design has been performed. The design confirmation program required an increase in the technical specification UHS temperature limit to 95F. This technical specification change request was reviewed by the NRC and the NRC issued Technical Specifications Amendment No. 109, dated February 14, 1989. In addition to this confirmation program, the following activities which were planned before the generic letter was issued meet the intent of the requested action.

a. Single Failure Proof Design

To support the development of the Equipment Qualification Master List (EQML), FPC developed Shutdown Logic Diagrams (SLD's) and Safety Function Diagrams (SFD's). The SLD's depict all the systems required to mitigate the design basis accidents described in Chapter 14 of the CR-3 FSAR. The SFD's depict all components of a system required to achieve a particular safety function. In addition to supporting the EQML, the SFD's are also used to confirm that the SW, RW, and DC Systems will perform their safety function with a single active failure.

b. As-Built Configuration

The previous and ongoing efforts of several FPC nuclear departments including Systems Engineering, Quality Programs, and Configuration Management continue to demonstrate that the as-built system configuration is in accordance with the appropriate licensing basis documentation. The overlapping responsibilities, among these independent groups, particularly regarding system walkdowns, minimizes the opportunity for any anomaly going undetected.

FPC uses the System Engineer approach to designate the person accountable for maintaining an awareness of system performance. The RW/SW systems engineer periodically walks his equipment down, reviews plant performance data to observe trends in system performance, observes the maintenance and repair of system components, and participates in the EPRI Service Water Assistance Program (SWAP).

The Quality Programs Department (QPD) performs vertical audits on safety-related systems at CR-3. Such an audit reviews the various aspects of system fit and function. A selection of Operating, Surveillance, and Abnormal procedures are reviewed in conjunction with applicable electrical and flow diagrams. Various forms of design basis information are reviewed for consistency. A random selection of design change packages are reviewed to ensure that all administrative, technical, and regulatory concerns are adequately addressed. Complete system walkdowns focus on system function, instrument calibration, housekeeping, and general system condition. Recommendations are brought to the attention of the responsible organization for review and corrective action, if necessary. QPD completed an audit of the RW and DC Systems in November 1989 with no major findings. An audit by QPD was performed in November 1992 to examine areas impacting the CR-3 Service Water systems. This audit identified nine findings which FPC classified as requiring Problem Reports to assure tracking and closure.

While the generic letter did not require the reconstitution of the design basis of the service water systems, such a program is ongoing at CR-3 with the Configuration Management Program. The existing Design Basis Documents have been replaced with Enhanced Design Basis Documents (EDBD) for each system. To support this effort, all original design basis calculations were assembled and reviewed. Key assumptions used in the original analyses were reverified. The effort concluded with a comprehensive system walkdown.

V. Maintenance practices, operating and emergency procedures, and training at CR-3 involves a comprehensive set of management directives, plant operating quality assurance manual procedures, training department procedures. Revisions to these documents occur whenever updated information is obtained from various sources. For example, review of technical information is controlled by Administrative Procedure AI-404A, "Review of Technical Information" and AI-404B, "Review of Industry Operating Experience. These procedures cover correspondence from sources external to FPC. Included in these sources are technical information from Babcock & Wilcox (B&W), new vendor manuals/vendor manual revisions, B&W Transient Assessment Program (TAP) Reports, INPO Significant Operating Experience Reports (SOER), INPO Significant Events Reports (SER), INPO Significant Event Notices (SEN), NRC Notices, selected EPRI/NSAC Reports, etc. This process has been established to ensure that "lessons learned" can be factored into plant maintenance, operations, training, and engineering.

THIS PAGE IS NOT PART OF THE RESPONSE

WHAT'S CHANGED BETWEEN 1/90 & 7/94 LETTERS

Action Item I

FPC said we would use PM-112 to clean RW heat exchangers every 42 days. In fact, we normally take an SW heat exchanger out of service every week on a rotating basis.

We are clarifying that the DC coolers are under Tech Spec control and require entry into an action statement or an outage to work on. Also clarified that the DC coolers do not foul like the SW coolers. These coolers were also eliminated from the 42 day cleaning requirement.

The earlier letter said we inspect the intake structure and raw water pits every refueling outage. We did not do that in Refuel 8. We did it in Refuel 9 and cleaned out macrofouling. We plan to inspect both trains in Refuel 10. Right now, we are telling the NRC that we plan to alternate cleaning one outage and inspecting the next.

Action Item II

The 1990 letter said we use a combination of testing and frequent regular maintenance (FRM) for the open system coolers. We have been relying on FRM except for the testing in 1987 for the ultimate heat sink problem (the 1990 letter already covered this testing).

The 1990 letter said we were evaluating a periodic testing program to establish the level of testing and any modifications necessary for testing. We said we plan to complete any modifications or tests by the end of Refuel 8. This evaluation is still ongoing and no modifications or tests were completed in Refuel 8 or 9.

We discuss in the new letter our plans to use EPRI's Single Tube Tester for heat exchanger testing. Final plans are still in development.

Action III

The 1990 letter said we were going to inspect the RW large bore lined piping in Refuel 7. That was done and we are telling the NRC that there are no negative findings. We are also telling them we continue to perform periodic visual inspections of lined piping as equipment is available.

Action IV

In the 1990 letter, we said we were developing Shutdown Logic Diagrams and Safety Function Diagrams. We changed the tense of the sentence to indicate that these diagrams have been developed and are being used to confirm the cooling water systems will perform their safety function.

We added to this letter a discussion of the November 1992 QPD audit of the Service Water Systems.

We are confirming that comprehensive system walkdowns have been performed and key assumptions used in the original analyses have been reverified.

Action Item V

Since we no longer do 24 month review of most procedures (with NRC approval) we revised this item to eliminate the 24 month statement.

FPC confirms that its personnel use the directives, procedures, training lesson plans, etc. to manage the CR-3 service water systems, as well as, other plant systems, components, and equipment. Evaluations by FPC's QPD, as well as outside groups such as INPO, support our confirmation. Corrective actions are identified and properly dispositioned. As stated earlier, CR-3's management practices are on-going. If the periodic surveillance programs or periodic testing indicate that modifications to the systems are necessa y or that procedures should be revised, FPC will follow its established programs to ensure that its systems remain in compliance with regulations.